

Remarks

The Office Action mailed June 1, 2005 has been reviewed and the following remarks have been made in consequence thereof.

Claims 1, 3-11, and 13-20 are now pending in this application. Claims 1-20 are rejected. Claims 21-23 are withdrawn from consideration. Claims 1-23 are subject to election/restriction requirement. Claims 2, 12, and 21-23 are canceled without prejudice, waiver, or disclaimer. Claims 1, 10, 11, and 20 have been amended. No new matter has been added.

Applicants acknowledge that the restriction requirement has been made final, and Applicants have cancelled Claims 21-23, which were withdrawn from prosecution as a result of the restriction requirement.

The objection to Claims 10 is respectfully traversed. Applicants have amended Claim 10. Accordingly, Applicants respectfully request that the objection to Claim 10 be withdrawn.

The rejection of Claims 1, 3-9, 11, and 13-19 under 35 U.S.C. § 102(b) as being anticipated by Possin et al. (U.S. Patent No. 6,167,110) is respectfully traversed.

Possin et al. describe a plurality of sensor elements (22) having a pitch limiting a resolution in a horizontal direction. In addition to the resolution of an image in a z-axis that is provided by a collimator (32), an imager apparatus (45) further provides resolution in an image plane defined by a plurality of respective focal alignment axes (25). This spatial resolution is provided in part by a light-guiding scintillator, such as fiber optic scintillator (34) that has a relatively large number of optical fibers per diode.

Claim 1 recites a radiation detector, the radiation detector comprising “a first array comprising a first photon incident surface; a second array comprising a second photon incident surface; and a scintillator array extending from said first photon incident surface to said second photon incident surface, wherein said first and second

arrays are separated from each other by said scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction, said first and second arrays are located within the same radiation detector.

Possin et al. do not describe or suggest a radiation detector as recited in Claim 1. Specifically, Possin et al. do not describe or suggest the first and second arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction, the first and second arrays are located within the same radiation detector. Rather, Possin et al. describe a plurality of sensor elements having a pitch limiting a resolution in a horizontal direction. Possin et al. also describe a light-guiding scintillator having a relatively large number of optical fibers per diode and providing spatial resolution. Accordingly, Possin et al. do not describe or suggest the first and second arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch, the first and second arrays are located within the same radiation detector. For the reasons set forth above, Claim 1 is submitted to be patentable over Possin et al.

Claims 3-9 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 3-9 are considered in combination with the recitations of Claim 1, Applicants submit that Claims 3-9 likewise are patentable over Possin et al.

Claim 11 recites a method for fabricating a radiation detector, the method comprising “fabricating a first array including a first photon incident surface; fabricating a second array including a second photon incident surface; positioning a scintillator array between the first array and the second array such that the scintillator extends from the first photon incident surface to the second photon incident surface; and placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction.”

Possin et al. do not describe or suggest a method for fabricating a radiation detector as recited in Claim 11. Specifically, Possin et al. do not describe or suggest

placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction. Rather, Possin et al. describe a plurality of sensor elements having a pitch limiting a resolution in a horizontal direction. Possin et al. also describe a light-guiding scintillator having a relatively large number of optical fibers per diode and providing spatial resolution. Accordingly, Possin et al. do not describe or suggest placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch. For the reasons set forth above, Claim 11 is submitted to be patentable over Possin et al.

Claims 13-19 depend, directly or indirectly, from independent Claim 11. When the recitations of Claims 13-19 are considered in combination with the recitations of Claim 11, Applicants submit that Claims 13-19 likewise are patentable over Possin et al.

For at least the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 1, 3-9, 11, and 13-19 be withdrawn.

The rejection of Claims 1, 4-7, 11, and 14-17 under 35 U.S.C. § 102(b) as being anticipated by Bjorkholm et al. (U.S. Patent No. 4,303,860) is respectfully traversed.

Bjorkholm et al. describe a photodiode array (5). The photodiode array includes many small photodiode elements (7), each of which is adapted to generate an electrical signal corresponding to an intensity of light seen along a surface of a photodiode element that abuts a top lateral surface (9) of a scintillation crystal (3).

Claim 1 recites a radiation detector, the radiation detector comprising "a first array comprising a first photon incident surface; a second array comprising a second photon incident surface; and a scintillator array extending from said first photon incident surface to said second photon incident surface, wherein said first and second arrays are separated from each other by said scintillator array and are offset from each

other by approximately one-half detector pitch normal to an incident x-ray direction, said first and second arrays are located within the same radiation detector.

Bjorkholm et al. do not describe or suggest a radiation detector as recited in Claim 1. Specifically, Bjorkholm et al. do not describe or suggest the first and second arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction, the first and second arrays are located within the same radiation detector. Rather, Bjorkholm et al. describe a photodiode array that includes many small photodiode elements, each of which is adapted to generate an electrical signal corresponding to an intensity of light seen along a surface of a photodiode element that abuts a top lateral surface of a scintillation crystal. Accordingly, Bjorkholm et al. do not describe or suggest the first and second arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch, the first and second arrays are located within the same radiation detector. For the reasons set forth above, Claim 1 is submitted to be patentable over Bjorkholm et al.

Claims 4-7 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 4-7 are considered in combination with the recitations of Claim 1, Applicants submit that Claims 4-7 likewise are patentable over Bjorkholm et al.

Claim 11 recites a method for fabricating a radiation detector, the method comprising “fabricating a first array including a first photon incident surface; fabricating a second array including a second photon incident surface; positioning a scintillator array between the first array and the second array such that the scintillator extends from the first photon incident surface to the second photon incident surface; and placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction.”

Bjorkholm et al. do not describe or suggest a method for fabricating a radiation detector as recited in Claim 11. Specifically, Bjorkholm et al. do not

describe or suggest placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction. Rather, Bjorkholm et al. describe a photodiode array that includes many small photodiode elements, each of which is adapted to generate an electrical signal corresponding to an intensity of light seen along a surface of a photodiode element that abuts a top lateral surface of a scintillation crystal. Accordingly, Bjorkholm et al. do not describe or suggest placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch. For the reasons set forth above, Claim 11 is submitted to be patentable over Bjorkholm et al.

Claims 14-17 depend, directly or indirectly, from independent Claim 11. When the recitations of Claims 14-17 are considered in combination with the recitations of Claim 11, Applicants submit that Claims 14-17 likewise are patentable over Bjorkholm et al.

For at least the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 1, 4-7, 11, and 14-17 be withdrawn.

The rejection of Claims 1, 5-7, 11, and 15-17 under 35 U.S.C. § 102(b) as being anticipated by Cusano (U.S. Patent No. 4,187,427) is respectfully traversed.

Cusano describes a plurality of wall members and collimator members (12, 14, and 16) formed from a rigid material. Prior to assembly, or after, internal surfaces of the wall and collimator members are coated with an optically reflective material so that light generated by a plurality of scintillator bodies placed within a plurality of volumes defined, is eventually directed to a plurality of photoelectrically responsive detectors (18).

Claim 1 recites a radiation detector, the radiation detector comprising "a first array comprising a first photon incident surface; a second array comprising a second photon incident surface; and a scintillator array extending from said first photon incident surface to said second photon incident surface, wherein said first and second

arrays are separated from each other by said scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction, said first and second arrays are located within the same radiation detector.

Cusano do not describe or suggest a radiation detector as recited in Claim 1. Specifically, Cusano does not describe or suggest the first and second arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction, the first and second arrays are located within the same radiation detector. Rather, Cusano describes a plurality of photoelectrically responsive detectors that receive light generated by a plurality of scintillator bodies. Accordingly, Cusano does not describe or suggest the first and second arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch, the first and second arrays are located within the same radiation detector. For the reasons set forth above, Claim 1 is submitted to be patentable over Cusano.

Claims 5-7 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 5-7 are considered in combination with the recitations of Claim 1, Applicants submit that Claims 5-7 likewise are patentable over Cusano.

Claim 11 recites a method for fabricating a radiation detector, the method comprising “fabricating a first array including a first photon incident surface; fabricating a second array including a second photon incident surface; positioning a scintillator array between the first array and the second array such that the scintillator extends from the first photon incident surface to the second photon incident surface; and placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction.”

Cusano does not describe or suggest a method for fabricating a radiation detector as recited in Claim 11. Specifically, Cusano does not describe or suggest placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each

other by approximately one-half detector pitch normal to an incident x-ray direction. Rather, Cusano describes a plurality of photoelectrically responsive detectors that receive light generated by a plurality of scintillator bodies. Accordingly, Cusano does not describe or suggest placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch. For the reasons set forth above, Claim 11 is submitted to be patentable over Cusano.

Claims 15-17 depend, directly or indirectly, from independent Claim 11. When the recitations of Claims 15-17 are considered in combination with the recitations of Claim 11, Applicants submit that Claims 15-17 likewise are patentable over Cusano.

For at least the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 15-17 be withdrawn.

The rejection of Claims 2 and 12 under 35 U.S.C. § 103(a) as being unpatentable over Possin et al. in view of Hu et al. (U.S. Patent 5,510,622) is respectfully traversed.

Claims 2 and 12 have been canceled. For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 2 and 12 be withdrawn.

The rejection of Claim 10 under 35 U.S.C. § 103(a) as being unpatentable over Possin et al. in view of Cusano and Hu et al. is respectfully traversed.

Possin et al. and Cusano are described above. Hu et al. describe a two-dimensional array of detector elements in which individual detector elements in adjacent rows, or columns, or both rows and columns are altered to reduce an effective detector pitch along one or both dimensions of the detector array without reducing a surface area of the detector. The pitch is reduced along one dimension by translating alternate rows or columns of detector elements one-half the length of a detector element along that dimension.

Claim 10 recites a radiation detector, the radiation detector comprising “a first array comprising a first photon incident surface and a plurality of sensor elements having an aperture pitch size; a second array comprising a second photon incident surface and a plurality of sensor elements having the aperture pitch size; and a scintillator array extending from said first photon incident surface to said second photon incident surface, said scintillator array is configured to direct at least a portion of a plurality of optical photons to said first photon incident surface and said second photon incident surface, said scintillator comprising a fiber optic scintillator having a plurality of optical fibers bundled in an array and disposed such that said x-rays are incident on said fiber optic scintillator substantially perpendicular to a respective optical axis of said plurality of optical fibers, said fiber optic scintillator further being optically coupled to at least two of said sensor elements such that said sensor elements are disposed at both ends of the plurality of optical fibers, wherein said first and second array sensor elements are separated from each other by said scintillator array and are offset from each other by approximately one-half the aperture pitch size, said first and second array sensor elements are located within the same radiation detector.”

None of Possin et al., Cusano, or Hu et al., considered alone or in combination, describe or suggest a radiation detector as recited in Claim 10. Specifically, none of Possin et al., Cusano, or Hu et al., considered alone or in combination, describe or suggest the first and second array sensor elements are separated from each other by the scintillator array and are offset from each other by approximately one-half the aperture pitch size, the first and second array sensor elements are located within the same radiation detector. Rather, Possin et al. describe a plurality of sensor elements having a pitch limiting a resolution in a horizontal direction. Possin et al. also describe a light-guiding scintillator having a relatively large number of optical fibers per diode and providing spatial resolution. Cusano describes a plurality of photoelectrically responsive detectors that receive light generated by a plurality of scintillator bodies. Hu et al. describe a plurality of alternate rows or columns of detector elements that are translated one-half a length of a detector element along a dimension to reduce a pitch along the dimension. Accordingly, none of Possin et al., Cusano, or Hu et al., considered alone or in combination, describe or suggest the first and second array sensor elements are

separated from each other by the scintillator array and are offset from each other by approximately one-half the aperture pitch, the first and second array sensor elements are located within the same radiation detector. For the reasons set forth above, Claim 10 is submitted to be patentable over Possin et al. in view of Cusano and Hu et al.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claim 10 be withdrawn.

The rejection of Claim 20 under 35 U.S.C. § 103(a) as being unpatentable over Possin et al. in view of Cusano is respectfully traversed.

Possin et al. and Cusano are described above.

Claim 20 recites a method for fabricating a radiation detector, the method comprising “fabricating a first array including a first photon incident surface including a plurality of sensor elements including a plurality of photosensor devices; fabricating a second array including a first photon incident surface including a plurality of sensor elements including a plurality of photosensor devices; positioning a scintillator array between the first array and the second array such that the scintillator extends from the first photon incident surface to the second photon incident surface, the scintillator array is configured to direct at least a portion of a plurality of optical photons to the first photon incident surface and the second photon incident surface, the scintillator including a fiber optic scintillator including a plurality of optical fibers bundled in an array and disposed such that the x-rays are incident on the fiber optic scintillator substantially perpendicular to a respective optical axis of the plurality of optical fibers, the fiber optic scintillator further being optically coupled to at least two of the sensor elements such that the sensor elements are disposed at both ends of the plurality of optical fibers; and placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction.”

Neither Possin et al. nor Cusano, considered alone or in combination, describe or suggest a method for fabricating a radiation detector as recited in Claim 20. Specifically, neither Possin et al. or Cusano, considered alone or in combination,

describe or suggest placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch normal to an incident x-ray direction. Rather, Possin et al. describe a plurality of sensor elements having a pitch limiting a resolution in a horizontal direction. Possin et al. also describe a light-guiding scintillator having a relatively large number of optical fibers per diode and providing spatial resolution. Cusano describes a plurality of photoelectrically responsive detectors that receive light generated by a plurality of scintillator bodies. Accordingly, neither Possin et al. or Cusano, considered alone or in combination, describe or suggest placing, within the same radiation detector, the first and second arrays such that the arrays are separated from each other by the scintillator array and are offset from each other by approximately one-half detector pitch. For the reasons set forth above, Claim 20 is submitted to be patentable over Possin et al. in view of Cusano.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claim 20 be withdrawn.

Moreover, Applicants respectfully submit that the Section 103 rejections of Claims 10 and 20 are not proper rejections. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None of Possin et al., Cusano, or Hu et al., considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Possin et al. with Cusano or Hu et al. because there is no motivation to combine the references suggested in the cited art itself.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both

found in the prior art, and not based on Applicants' disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejections are based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Possin et al. teach a plurality of sensor elements having a pitch limiting a resolution in a horizontal direction. Possin et al. also teach a light-guiding scintillator having a relatively large number of optical fibers per diode and providing spatial resolution. Cusano teaches a plurality of photoelectrically responsive detectors that receive light generated by a plurality of scintillator bodies. Hu et al. teach a plurality of alternate rows or columns of detector elements that are translated one-half a length of a detector element along a dimension to reduce a pitch along the dimension. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejections appear to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejections of Claims 10 and 20 be withdrawn.

For at least the reasons set forth above, Applicants respectfully request that the rejections of Claims 10 and 20 under 35 U.S.C. 103(a) be withdrawn.

The provisional double patenting rejection under 35 U.S.C. § 101 of Claims 1, 3-9, 11, and 13-20 as being unpatentable over Claims 1, 3-9, 11, and 13-20 in a co-pending U.S. Patent Application No. 10/308,233 is respectfully traversed.

Independent Claims 1, 11, and 20 have been amended. Moreover, Claims 1, 3-9, 11, and 13-20 in the co-pending application have not yet issued in a U.S. patent. Claims 3-9 depend, directly or indirectly, from Claim 1 and Claims 13-19 depend, directly or indirectly, from independent Claim 11. When the recitations of claims 3-9 are considered in combination with the recitations of Claim 1 and the recitations of Claims 13-19 are considered in combination with the recitations of claim 11, Applicants submit that dependent Claims 3-9 and 13-19 likewise are patentable over Claims 1, 3-9, 11, and 13-20 of the co-pending application.

For at least the reasons set forth above, Applicants respectfully request that the double patenting rejection of Claims 1, 3-9, 11, and 13-20 be withdrawn.

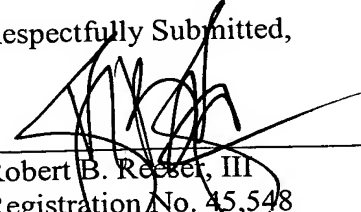
The provisional rejection of Claims 2, 10, and 12 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 2, 10, and 12 in the co-pending U.S. Patent Application No. 10/308,233 in view of Hu et al. is respectfully traversed.

Claims 2 and 12 have been canceled. Moreover, independent Claim 10 has been amended. Furthermore, Claim 2, 10, and 12 of the co-pending application have not issued in a U.S. Patent.

For at least the reasons given above, Applicants respectfully request that the provisional double patenting rejection of Claims 2, 10, and 12 be withdrawn.

In view of the foregoing amendment and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



Robert B. Reiser, III
Registration No. 45,548
ARMSTRONG TEASDALE LLP
One Metropolitan Square, Suite 2600
St. Louis, Missouri 63102-2740
(314) 621-5070